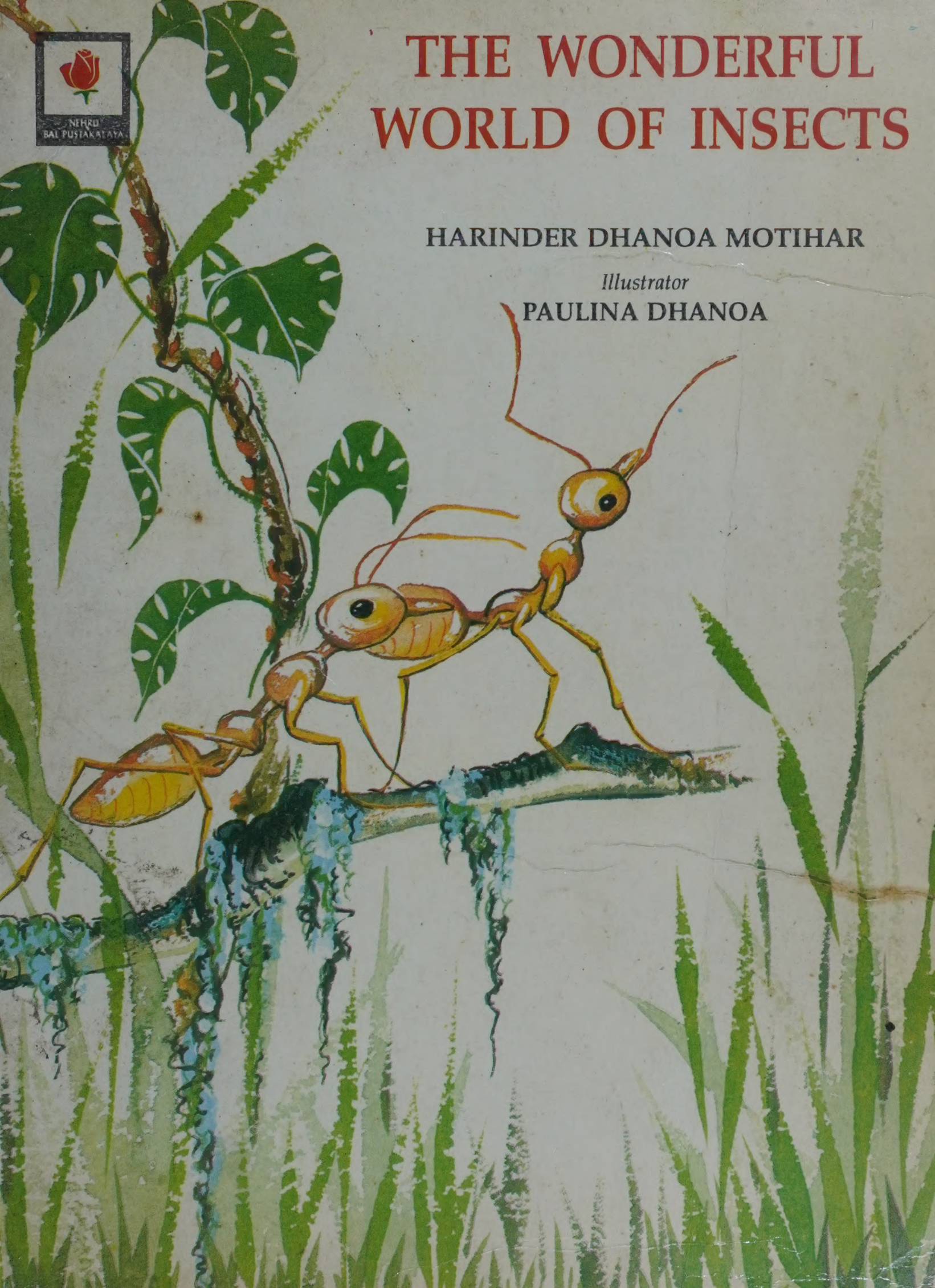

THE WONDERFUL WORLD OF INSECTS

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PAULINA DHANOA

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The Wonderful World of Insects

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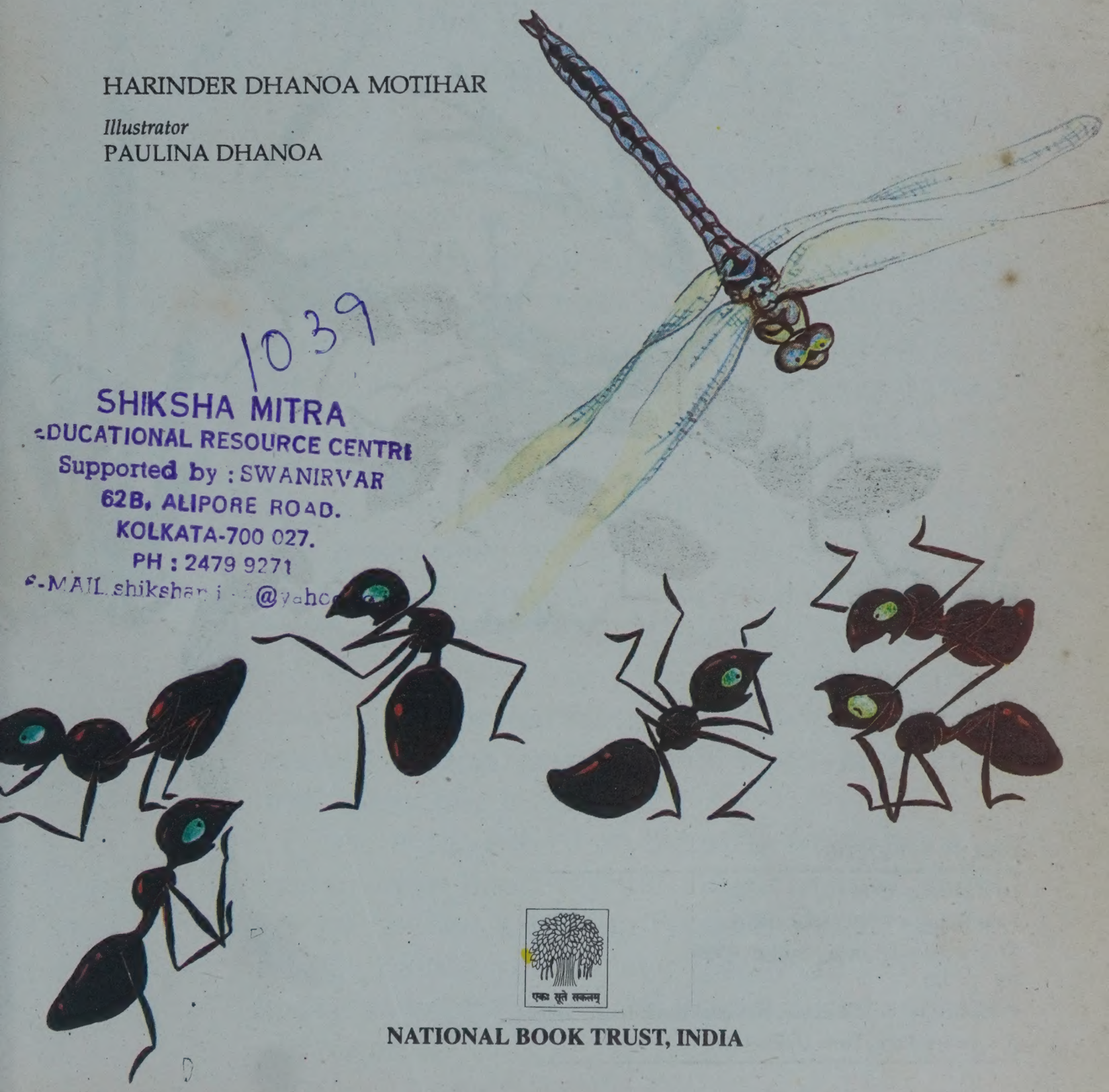

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NATIONAL BOOK TRUST, INDIA

ISBN 81-237-1721-0

First Edition 1996
First Reprint 1999 *(Saka 1920)*
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Rs. 11.00
Published by the Director, National Book Trust, India
A-5 Green Park, New Delhi-110 016

THE WONDERFUL WORLD OF INSECTS

Insects are found all over India from the icy Himalayas to the burning sands of the Thar Desert. They are found in the murky depths of rivers and lakes, and in the grass in your neighbourhood park. In fact, insects are everywhere—flying in the air, hidden among leaves and flowers, buried deep in the ground and even swimming in the water!

Some insects are so small that you may not be able to see them while others like certain beetles are as big as a mouse. Yet the smaller insects are the more active. Did you know that ants and bees pull or lift objects many times heavier than their own weight, or that flies flap their wings as many as one thousand times a second? Insects are strange and fascinating creatures.

Insects have lived on the earth for millions of years, longer than even the ancient reptiles. There are more than a million types of insects in the world. Would you believe that there are more kinds of insects than all the other kinds of animals put together?

That does seem hard to believe until you take a close look around you. If you start paying attention to your surroundings, a new world made up of hundreds of tiny creatures will be slowly revealed to you—ants and bees, ladybirds, beetles, butterflies, mosquitoes, crickets and grasshoppers. . . among many, many others.

Insects are divided into groups. The most common are the beetles, the butterflies and moths, the ants, bees, wasps and the flies.

WHAT IS AN INSECT?

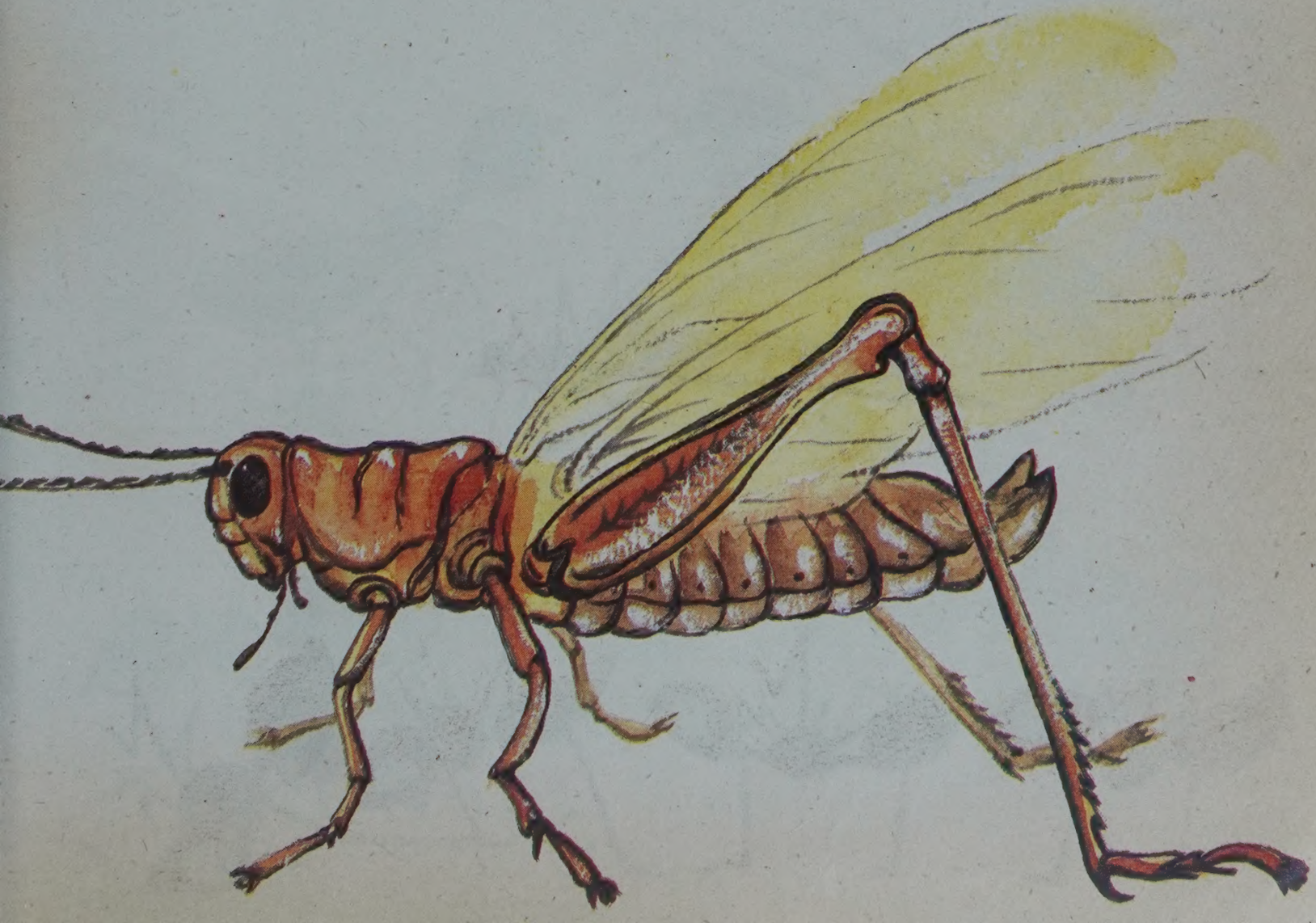
An insect is quite different from you and me. It has a body that is divided into three parts: the head, the middle which is called the thorax and the abdomen which is usually the largest part of the body.

Did you know that many insects can see in more than one direction without turning their heads? This is because they have compound eyes. Compound eyes are made up of lots of cone-shaped units packed close together.

An insect has something else which we don't. It has two antennae sticking out from the top of its head. Insects use their antennae to tell them about sound, touch, taste and smell.

Now we almost have the complete insect; a body divided into three parts, compound eyes and two antennae. But we've left out something. . . the legs. Guess how many legs the insect has? Well, multiply two by three and you have the answer. The insect has six legs. Add two pairs of wings to the insects that fly and you have the complete picture.

This is true of most but not all insects.



INSECTS AND THEIR FEET

Have you ever wondered how an insect walks? If I had six legs I'd probably get them all tangled up! Well most insects move three legs at a time. This means that they rest three legs on the ground, while they lift the other three. But which three do they move to keep their balance? They move the first and last of one side, plus the middle leg of the other side. Have you got that?

Stranger still is the insect walking upside down on the ceiling. Don't worry, it won't fall on you. This is because the legs are tipped with claws by which the insect is able to hold onto any surface. What's more under its claws it has a sticky pad which allows it to cling to any surface and even walk upside down on the ceiling.

Last, but not least, did you know that insects taste partly through their mouths and sometimes also through their feet!

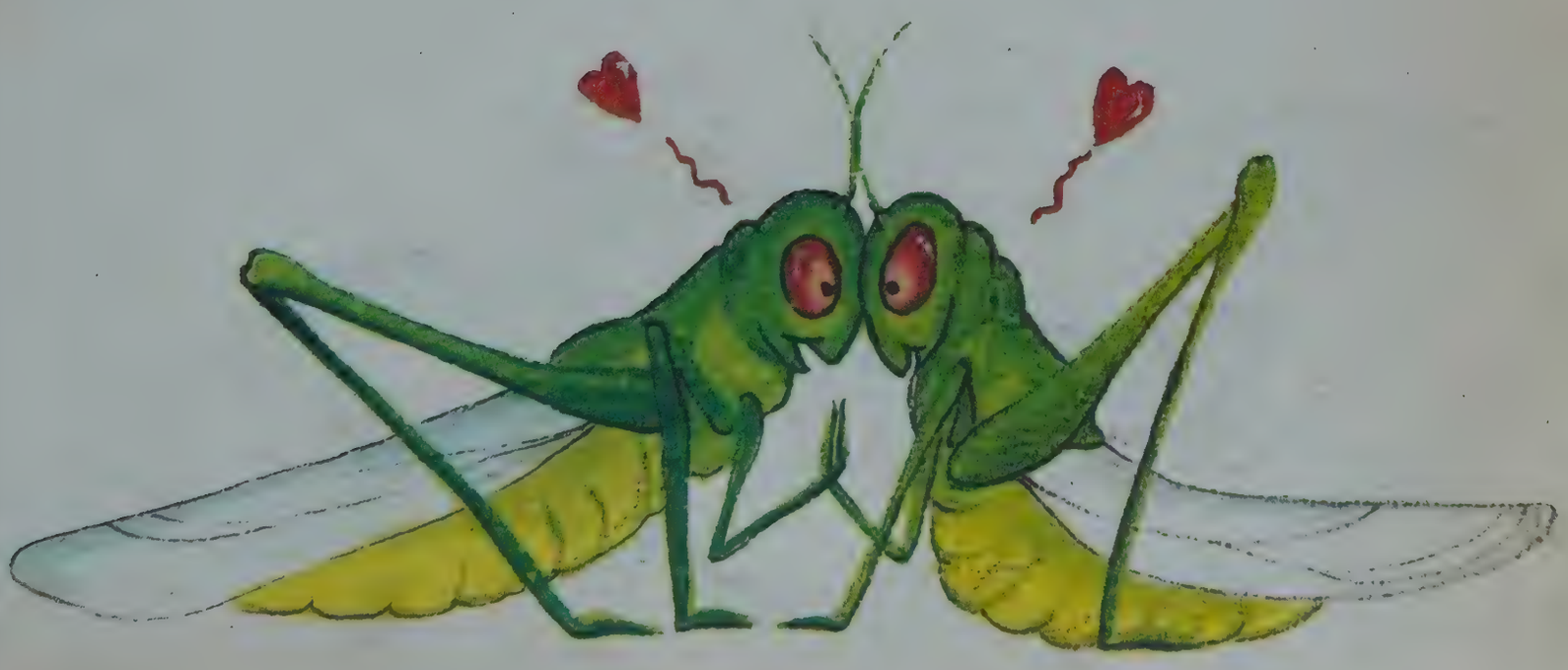
EARS OR NO EARS

I hope you're all ears for what comes next, because it may surprise you to hear that only a few insects have 'ears'. Among the insects that have hearing organs are the grasshoppers, crickets, katydids, cicadas and some moths. The short-horned grasshoppers, often called locusts have their hearing organs located on the side of their abdomens.

The long-horned grasshoppers, katydids and crickets have their ears on their front legs.

How do other insects hear? Most insects have some hair on their bodies and when these vibrate, they know that something is approaching. They also use their antennae to tell them about sound.

Talking about sound, you must have heard the cheerful chirping of the grasshopper or the shrill song of the cricket. Neither of them sing like you and I do because they don't have voices. They are clever musicians or fiddlers. Grasshoppers make music by drawing their hind legs like a bow against the edge of their wings, and the brown cricket, lying low on the ground, sings its song, by rubbing its two front wings together. If you locate this talented musician, you will find that it is a male. It sings to call the female. Because crickets have ears, the female actually responds to the song.



THE LIFE STORY OF THE CATERPILLAR OR METAMORPHOSIS

You must have heard the tale of the ugly duckling that turned into a swan. Well then, it won't be difficult for you to guess the end of the caterpillar story.

The caterpillar was born on a leaf with others of its kind, as a tiny little egg. One day, the egg cracked, and the caterpillar emerged into the bright, sunny world.

The first thing the caterpillar thought of was food! All around the green leaves smelt fresh and inviting so it immediately got down to eating a leaf. It wasn't long before there was nothing left of the leaf and the caterpillar moved on to another leaf and then another and so on and on.

As the caterpillar continued to munch and chew it grew and grew, and its coat got tighter and tighter, till it was so tight that it split to show a brand new coat. This happened many times and each new coat had lovely colours.

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Are you wondering how the caterpillar kept changing its coat? The answer is that insects don't have bones. Their bodies are stiffened by a hard skin. Because their skin is hard, insects cannot grow bigger gradually. They have to moult or shed their skin and replace it with a new or larger skin.

There is more to the caterpillar story. After a while the caterpillar stopped eating and stopped moving. It spun a cocoon around itself and hung as a chrysalis from a twig!

After a few weeks, the cocoon broke open and would you believe it—a gorgeous butterfly crept out. It spread its colourful wings slowly and rose into the air. After swooping down on one bright flower after another it finally flew off to a cluster of honeysuckle and sucked the sweet nectar.

The caterpillar had turned into a butterfly! The caterpillar's story is called Metamorphosis. That's how most insects grow; from an egg, to larva, to pupa, to full grown adult. The young of some insects like the dragonfly, however, look like their parents at birth.

MANY HANDS MAKE WORK LIGHT

Some insects live on their own and others live in groups. Among the 'social insects' are ants, termites and certain species of bees and wasps.

You may have noticed the tiny ant marching busily across the room. It climbs over every obstacle you might place in its way, never pausing for a second, intent on some serious mission. These busy creatures live in colonies just as we do. In the ant city, deep down in the earth, the ant-citizens work together, each helping the other. There is a maze of tunnel-like streets underground which lead to little rooms. There are egg-rooms, nurseries, store-rooms and bedrooms!

In an ant colony there is the queen ant or mother who lays eggs, male ants who do not work and worker ants who are female but do not lay eggs. The queen ant is easy to recognize as she is larger than other ants and has long wings. The lazy male ant also has two pairs of wings but the female worker ant is small with no wings.

Female worker ants do all the work in the ant city. They carry the eggs laid by the queen to the nurseries and watch over them. When the little grubs hatch, the nurse ants look after them with great care. They feed and clean them. During the day they carry the grubs to warm upper rooms.

Some ants are builders. They build and repair the tunnels and chambers. There are even slaves among the ants. An average colony has around two thousand ants.

Then there are the army ants who are like trained, disciplined soldiers and are a deadly force to contend with. They set off like an army on the march, destroying everything that comes in their way, even animals.

Another 'social insect' is the bee. As in the ant family, the queen is the most important member of the honeybee family. A queen bee may have up to forty thousand subjects under her! The queen's main job is to lay eggs. She lays more than a million eggs over a period of about four years. Here, too, the workers are female and are kept very, very busy. The lazy male or drone has no function and idles away his time.

Worker bees collect nectar and pollen from flowers. The bee turns this nectar and pollen into sweet honey, which it stores in special cells for food in bad weather when it cannot go out.

Worker bees do various jobs. Not only do they feed the larvae or young but they also keep the temperature in the

hive constant. When the hive gets too warm, some of the workers cool the air by 'whirring' their wings very fast like fans! During the short Indian winters bees do not die as they do in very cold countries. The workers cling together in a big ball with the queen they are helping to keep warm in the centre. When the bees on the outside grow too cold, they change places with those on the inside.

An interesting fact about both the ant and the bee family is how much more important the female is than the male. In fact, it seems that the female plays the more dominant role in the insect world. Another example is the mosquito. Did you know that only the female mosquito bites? It sucks blood from people and animals while the male only sucks water and plant juices.

WALKING STICKS AND OTHERS

Different groups of insects have different ways of protecting themselves. We all know the sting of the bee and wasp and the sharp bite of ants. Some insects use their claws as weapons while others even eject poisonous vapour or sprays and bad smells. Most interesting, however, are those that use defensive and not offensive methods. The natural colour of these insects helps them to blend into their surroundings, making it difficult to spot them.

Most of us have seen Stick Insects and may also have seen the Leaf Insect. These insects look so much like sticks or leaves that a hungry bird flying by will not recognize them as food. They move very slowly and pretend to be dead at the slightest threat.

An insect which resembles a leaf is the Leaf Butterfly. In flight this butterfly's wings show startling flashes of orange and purple but when resting, it looks exactly like a brown withered leaf.

Another insect that camouflages or conceals itself is the Thorn Bug. It looks just like the thorn of a rose plant. Talking about flowers, have you ever seen one walking? Don't try and pluck it. It is probably a caterpillar that has covered itself with petals so that it can carry on eating undisturbed.

You also have insects who merely pretend to be dangerous. One of them is the Hover Fly. It looks so much like a wasp that birds keep away from it. Some butterflies are also good at cheating. They copy the wing pattern and way of flying of other butterflies that birds avoid eating because of their unpleasant taste or smell.

An insect like the housefly has no weapons but its compound eyes allow it to protect itself very successfully. We all know how difficult it is to creep up behind a fly to swat it! The strong hind legs of crickets and grasshoppers similarly enable them to hop away to safety when threatened. Their colour also makes detection difficult.

The insects to watch out for, however, are the ones that use offensive weapons. Wasps are especially dangerous. While the sting of a single wasp is not likely to kill an adult human, the stings of an entire colony defending its nest can be fatal.

The Blister Beetle's means of defence is both effective and dangerous. When handled, it secretes a liquid, which causes huge and painful blisters on the skin.

Although the mosquito, flea and louse's bite is not harmful, the diseases they carry certainly are.

FOOD FOR ALL

Insects enjoy different kinds of food. Feeding habits are connected to the kind of mouthparts the insect has. Insects like the beetle, cricket, grasshopper, ant and several others have a pair of biting jaws while butterflies and moths have a sucking tube.

Insects with strong biting jaws may be meat-eaters or plant-eaters. Let's take a closer look at the meat-eating insects. Among the most interesting of the carnivorous insects are certain species of beetles. The Tiger Beetle, for example is a spectacular hunter and runs swiftly after its prey. The larva of this beetle lives in a pit in the ground and waits for passing insects to pounce upon.

Also carnivorous are the larvae of the beautiful firefly. Like the adult, these larvae may glow like lamps. They feed on slugs and snails. The adult firefly lives for a very short time and hardly feeds at all.

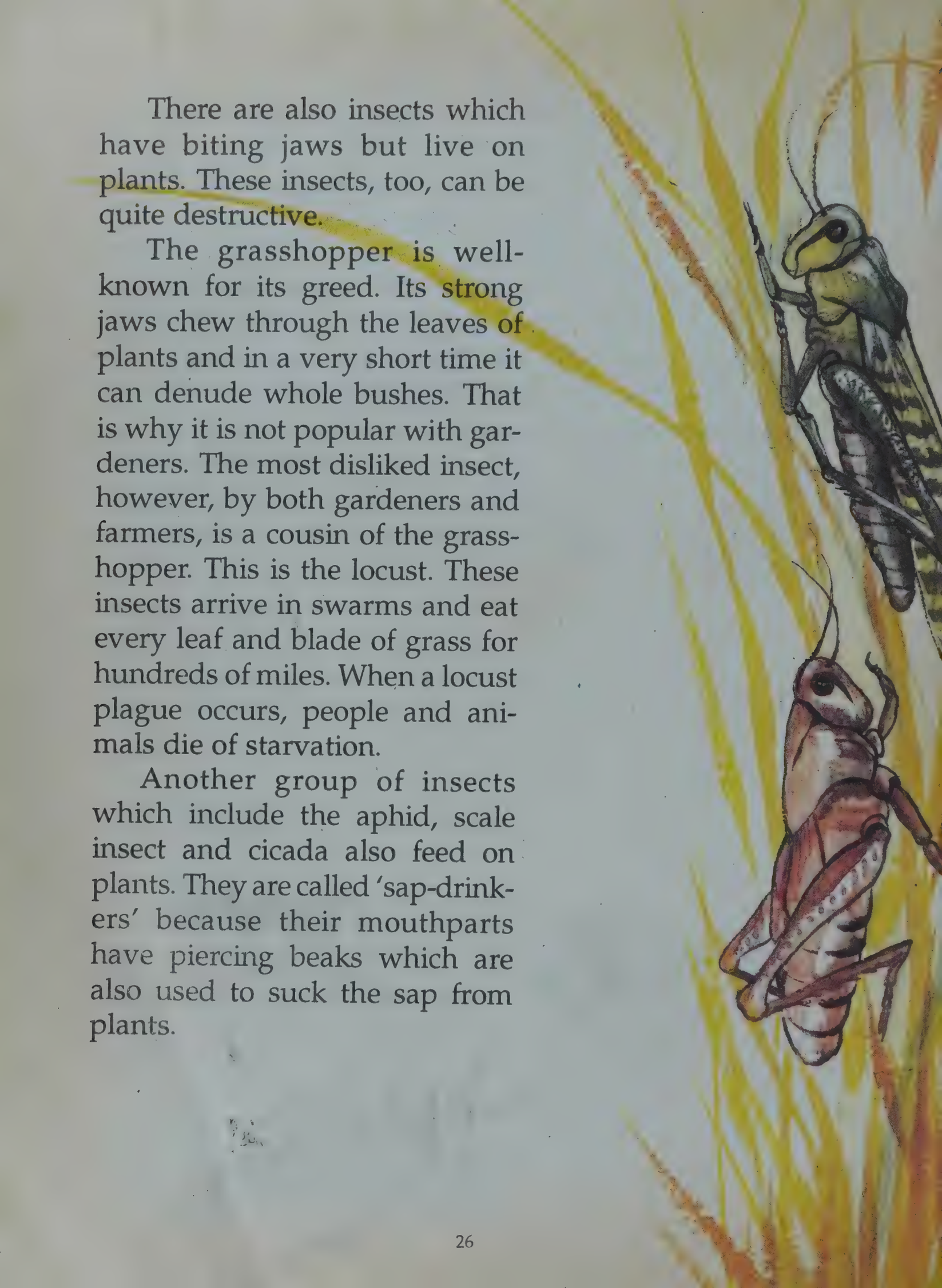
Even the gentle ladybird is a meat-eater and gardeners like it because it feeds on plant-destroying insects.

Among the most cunning of the meat-eating insects is the antlion's larva. This insect digs a V-shaped pit in the sand by flinging out sand with an upward flip of its head. Then, shallowly buried, it waits at the bottom of the pit for small unsuspecting insects to fall in. If, however, the insect doesn't fall far enough in, the larva flings sand at it until it comes tumbling down. Then the larva sucks its blood and body fluids.

There are also insects which have biting jaws but live on plants. These insects, too, can be quite destructive.

The grasshopper is well-known for its greed. Its strong jaws chew through the leaves of plants and in a very short time it can denude whole bushes. That is why it is not popular with gardeners. The most disliked insect, however, by both gardeners and farmers, is a cousin of the grasshopper. This is the locust. These insects arrive in swarms and eat every leaf and blade of grass for hundreds of miles. When a locust plague occurs, people and animals die of starvation.

Another group of insects which include the aphid, scale insect and cicada also feed on plants. They are called 'sap-drinkers' because their mouthparts have piercing beaks which are also used to suck the sap from plants.



Then there is the flea. The flea is a parasitic insect which means that it depends on another living thing for its food. The flea, like the louse and the bed-bug, lives on the blood of animals and human beings.

How do these insects suck blood? The flea, for example, has piercing and sucking mouthparts which it uses to puncture the skin and enjoy a blood meal. Fleas, however, can survive more than a year without food.

Although the larvae of the mosquito live in water and feed on organic matter, most female mosquitoes suck blood because they need blood for their eggs. As mentioned earlier, the male sips plant juices. When the female mosquito bites she injects a minute drop of fluid into the blood. It is this fluid which causes swelling and itching on our skin.

Ants don't seem to be choosy in their choice of food. You see them dragging a variety of eatables home—ranging from seeds to parts of dead insects. Most interesting, however, is the ant's relationship with the aphid. The aphid sucks plant juices for food. The clever ant then 'milks' the aphid of its sap or honeydew like a farmer milks a cow. In return the ant protects the aphid from its enemies.

Let us now move to the gentle butterflies and moths. Although they may be destructive to plant life as larvae (remember the greedy caterpillar?) the adult butterflies and moths suck nectar and other liquids through a long hollow tube or probiscus which is coiled up like a spiral when not in use.

The housefly, too, has no jaws or teeth and lives on liquid food. It has a trunk-like 'tongue' which is coated with sticky glue. When it lands on food, it spreads saliva on it which dissolves the food and thus it can draw it up through its tongue.

OVER AND UNDER WATER

I mentioned that you find insects everywhere, even in water. Bend over and look really closely at a pond. Can you see those little creatures gliding on the surface as if they were on ice-skates? They're Waterbugs! They run on the water as easily as we walk on the ground. The Waterbugs are coated with a waterproof secretion on their legs so that they don't break through the surface of the water.

Waterbugs live on other pond creatures. They use their front legs to grab and hold on to their prey. Their beak-like

mouthparts are used to suck the juices out of the pond insects they feed on.

If you're lucky you may even see the Water Boatman. This water beetle rows itself along with the help of its flattened oar-like hind legs. The Water Boatman spends long periods beneath the surface of the water.

Whoops! Did you see that sudden ripple in the water? That's the Diving Beetle. Although Diving Beetles can live on land, they're at home in water and are excellent swim-

mers and divers. Their bodies are smooth to allow them to swim fast and their hind legs which work like oars have fringes of hairs along the edges. The larvae of Diving Beetles are called Water Tigers. They have long sharp jaws and kill tadpoles and sometimes even fish which are much larger than them.

The creatures you see spinning madly on the surface of the water, turning circle after dizzy circle, are Whirligig

Beetles. These small, shiny, blue-black beetles are out on a hunting expedition. When small, light creatures fall on the 'skin' of the water, the alert Whirligig Beetle pounces on them before they can recover and fly away.

The dragonfly young live in the water. These creatures called nymphs, live in the water for months, sometimes even a year or more breathing through gills. They moult or shed their skin several times.

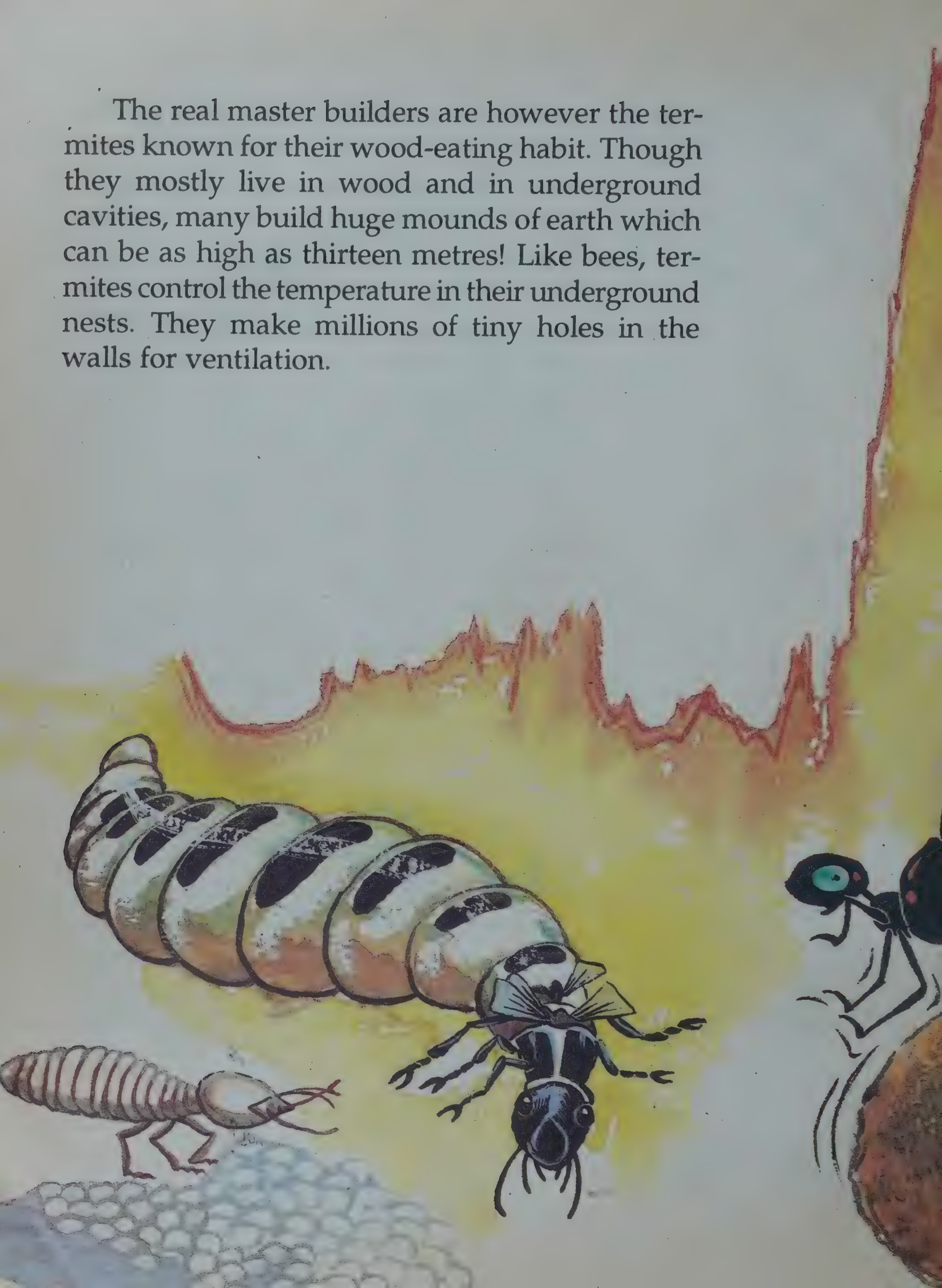
THERE'S NO PLACE LIKE HOME

We have talked about ant nests; honey bees and certain species of social wasps also construct elaborate homes. Honey bees secrete a wax from which they construct their hives.

The wasp hive is made by the queen wasp. First she chooses a good spot. It may be the branch of a tree, the eaves of a building, a deserted mouse-hole or a hollow tree. Next she goes to an old wooden post or dried tree stump and scrapes away the wood with her jaws. She chews these scraps to a pulp and moistens and cements it with her saliva. When spread out it dries into a paper-like substance. A little of this is fastened to the chosen spot. She then constructs small beautifully shaped paper cells with it.

Solitary wasps don't work quite as hard. The Potter Wasp, for example, makes a little jug-like mud nest which has a tiny hole on top. These are sometimes fastened quite high up on plants. After stinging a caterpillar just enough to paralyse it, this wasp stuffs the caterpillar into its nest. Once this difficult job is done, the wasp lays an egg in the nest and seals it. The paralysed caterpillar is put in the nest to ensure food for the larva when the egg hatches!

The real master builders are however the termites known for their wood-eating habit. Though they mostly live in wood and in underground cavities, many build huge mounds of earth which can be as high as thirteen metres! Like bees, termites control the temperature in their underground nests. They make millions of tiny holes in the walls for ventilation.



Not all insects make such permanent homes. Many live among plants and in trees, even laying their eggs on exposed leaves. Interesting, however, is the Leaf Roller Caterpillar which rolls a leaf into a little tube to make a home for itself. Then there is the Dung Beetle which carefully scoops up manure, rolls it into a ball, and uses it as an egg laying site.

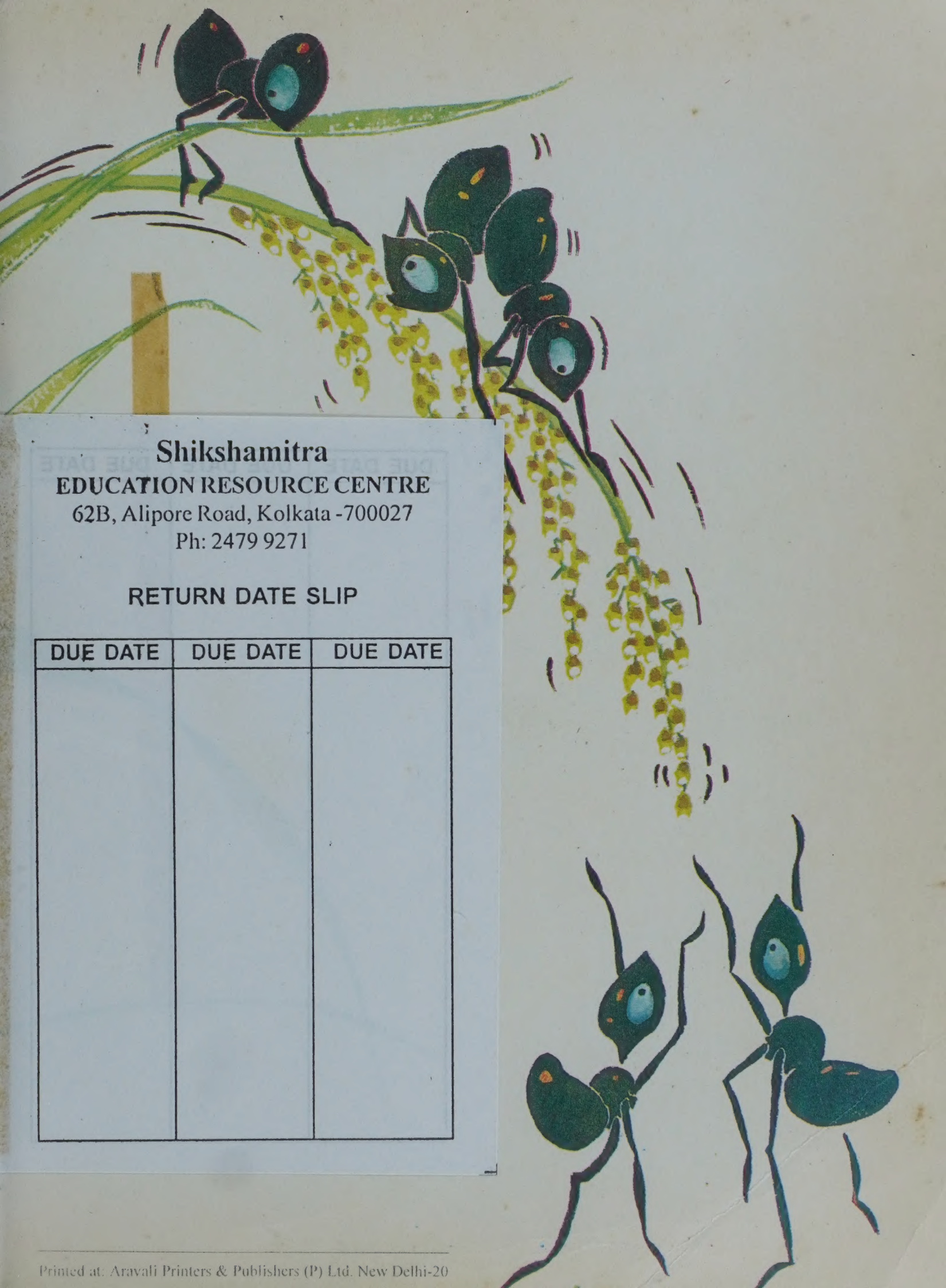
SHARING THE WORLD

All living creatures play an important role on earth. Often invisible to us, numerous little insects are active in keeping the plant world alive. You already know that insects help to fertilize plants by carrying pollen from one plant to another and that some insects like the ladybird are good friends of the gardener and help to keep the garden free of plant-eating pests.

Although insects like the locust destroy plants and food crops, most insects either directly or indirectly help man. Of the insects that directly help man, we think immediately of the bee and the delicious honey it produces, or of the silk worm and silk!

By eating or living as parasites on animals and on one another, insects help control their own population. Again, insects like the ant serve as garbage-men by dragging away and eating dead creatures and waste matter.

In short, there is a great deal of interdependence, of give and take, in the world of nature and insects are an integral part of this world.



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Printed at: Aravali Printers & Publishers (P) Ltd. New Delhi-20

Rs. 11.00

ISBN 81-237-1721-0

National Book Trust, India